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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/979,566	06/28/2002	Alison Mary Fairhurst	1084-011969	2819
7590 03/02/2004				
Kent E Baldauf 700 Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219-1818			EXAMINER WANG, GEORGE Y	
			ART UNIT 2871	PAPER NUMBER

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

SA

Office Action Summary	Application No.		Applicant(s)	
	09/979,566		FAIRHURST ET AL.	
	Examiner		Art Unit	
	George Y. Wang		2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 1-9, 16-19, 21-24 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-15, 20, 35-37 and 39-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group III, Claims 10-15, 20, 35-37, and 39-41 on November 17, 2003 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "LCD display and light-transmitting plate for display."

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 10, 12-13, 20, and 35 are rejected under 35 U.S.C. 102(b) as being anticipated by Gunjima et al. (U.S. Patent No. 5,587,816, from hereinafter "Gunjima").

5. Regarding claims 10, 12, and 20, Gunjima discloses an LCD (fig. 6, ref. 41) incorporating a light-transmitting element (fig. 3, ref. 7) having a surface relief or texturing that is stepped to form a Fresnel refracting arrangement to eliminate or reduce reflections (col. 10, lines 54-63).

6. As to claims 13 and 35, Gunjima discloses the LCD as recited above where the element has one surface which is stepped and is rendered at least partially light-reflecting to form a Fresnel reflecting arrangement (col. 10, lines 54-63).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 11, 14-15, 36-37, and 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunjima et al. (U.S. Patent No. 5,587,816, from hereinafter "Gunjima") in view of Van De Ven (U.S. Patent No. 4,911,529, from hereinafter "Van De Ven").

9. As per claim 11, Gunjima discloses the LCD as recited above, however, the reference fails to teach that the light-transmitting element forms the surface of the display which is closest to the viewer.

Van De Ven discloses an LCD display with a light-transmitting element forms the surface of the display which is closest to the viewer (fig. 1, ref. 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the a light-transmitting element forming the surface of the display closest to the viewer since one would be motivated to increase the ambient light at the edges, resulting in a reduction of the deterioration of the contrast in the observed image due to reflected ambient light than in the known screen (col. 1, lines 52-68).

10. Regarding claims 14 and 36, Gunjima discloses the LCD as recited above, however, the reference fails to teach that the individual portions or facets of the stepped surface are convexly or concavely curved.

Van De Ven discloses an LCD display with a light-transmitting element where the individual portions or facets of the stepped surface are convexly or concavely curved (fig. 3, ref. 122; col. 5, lines 9-14).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the individual portions or facets of the stepped surface as convexly or concavely curved since one would be motivated to create angular distribution of the light (col. 5, lines 2-7). Such a spreading is much better controlled and spreading outside the audience space is suppressed (col. 5, lines 2-7). Ultimately, this reduces uneven distribution and thereby enhances display quality (col. 4, lines 63-65).

11. As to claims 15 and 37, Gunjima discloses the LCD as recited above, however, the reference fails to teach the light-transmitting material being characterized by refractive index variations and forming light-deviating features imparting bulk light-diffusing properties to the material.

Van De Ven discloses an LCD display where the light-transmitting material is characterized by refractive index variations and forms light-deviating features imparting bulk light-diffusing properties to the material (col. 4, lines 52-61).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the light-transmitting material being characterized by refractive index variations and forming light-deviating features imparting bulk light-diffusing properties to the material since one would be motivated to spread light (col. 4 ,

lines 55-62). Furthermore, bulk diffusion creates the spreading of light uniformly in all directions that has advantages in high resolution and sharp images (col. 2, lines 48-56; col. 3, lines 1-6).

12. As per claim 39 and 40, Gunjima discloses an LCD cell (fig. 3, ref. 11) with upper (fig. 3, ref. 10) and lower (fig. 3, ref. 9) transparent plates superimposed on a plate having a first and second body of light-transmitting material (fig. 3, ref. 3) having a planar upper face parallel with the upper and lower plates of the LCD cell (fig. 3, ref. 12) and having a Fresnel-stepped or ramped lower surface (fig. 3, ref. 7) provided with a semi-reflective or transflective coating, the plate being disposed between the LCD cell and a backlighting (fig. 3, ref. 1) assembly arranged to direct light towards the cell perpendicularly

However, the reference fails to specifically disclose ambient light incident on the LCD cell at an angle to the perpendicular to the upper and lower plates and passes through the cell to the plate to be reflected by the semi-reflective coating.

Van De Ven discloses an LCD display with a Fresnel-stepped lower surface which is provided with a semi-reflective or transflective coating where ambient light is incident on the LCD cell at an angle to the perpendicular to the upper and lower plates and passes through the cell to the plate to be reflected by the semi-reflective coating (fig. 3; col. 4, lines 20-33).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a Fresnel-stepped lower surface which is provided with a

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semi-reflective or transflective coating where ambient light is incident on the LCD cell at an angle to the perpendicular to the upper and lower plates and passes through the cell to the plate to be reflected by the semi-reflective coating since one would be motivated to increase the angle from the center of the edge of the plate to provide correction for the audience space (col. 26-33). The result is a high contrast projection image for useful display applications (col. 3, lines 28-41).

13. As to claim 41, Gunjima discloses the LCD as recited above with a second body of light-transmitting material that is the same reflective index as the first body (col. 21, lines 6-14).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 571-272-2304. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-1562.


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gw

January 28, 2004


TOANTON
PRIMARY EXAMINER

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Withdrawn) A partially light-reflecting, partially light-transmitting plate or sheet comprising a first body of light-transmitting material having an outer surface and an inner stepped or ramped surface carrying or conforming with and/or adhered to a semi-reflective coating and a second body of light-transmitting material, on the opposite side of said semi-reflective coating from said first body of material, said other side of said coating being correspondingly stepped or ramped, said second body of light-transmitting material having an outer surface remote from said coating and an inner surface conforming with and/or adhered to said opposite side of said semi-reflective coating, the refractive index of said second body of light-transmitting material being equal or close to that of said first body of light-transmitting material, whereby light suffers little or no refraction in passing from said first to said second body of light-transmitting material.

2. (Withdrawn) A plate or sheet according to claim 1 wherein at least one said outer surface of said plate has a surface relief or texturing to eliminate or reduce reflection of light at said surface.

3. (Withdrawn) A light-transmitting plate or sheet comprising a first body of light-transmitting material having an outer surface and an inner stepped or ramped surface carrying or conforming with and/or adhered to a second body of light-transmitting material, said second body of light-transmitting material having an inner surface conforming with and/or adhered to said stepped or ramped surface of said first body, the refractive index of said second body of light-transmitting material being different from that of said first body of light-transmitting material, whereby light is refracted in passing from said first to said second body of light-transmitting material.

4. (Withdrawn) A light-transmitting plate or sheet according to claim 3 wherein said inner stepped or ramped surface of said first body of light-transmitting material has a semi-reflective coating and said second body of light-transmitting material thus has its inner surface conforming with or adhered to said semi-reflective coating.

5. (Withdrawn) A light-transmitting plate or sheet according to claim 3 wherein said stepped or ramped surface has no reflective or semi-reflective coating but wherein the stepped or ramped interface, corresponding with said surface, between said first and second bodies of light-transmitting material is rendered at least partially light reflective as a result of the refractive index difference between the two materials.

6. (Withdrawn) A plate or sheet according to claim 1, wherein individual portions or facets surfaces of said stepped or ramped surface have surface relief or texturing.

7. (Withdrawn) A plate or sheet according to claim 1, wherein individual portions or facets surfaces of said stepped or ramped surface are convexly or concavely curved.

8. (Withdrawn) A plate or sheet according to claim 1, wherein at least one of said light-transmitting materials is characterised by refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

9. (Withdrawn) A light crystal display incorporating a plate or sheet according to claim 1.

10. (Original) An LCD display, incorporating a light-transmitting element having a surface with surface relief or texturing to eliminate or reduce reflections.

11. (Currently Amended) ~~A display~~ The LCD display according to claim 10 wherein said surface of said element forms the surface of the display which is closest to the viewer.

12. (Currently Amended) ~~A display~~ The LCD display according to claim 10, wherein said element has one surface which is stepped to form a Fresnel refracting arrangement.

13. (Currently Amended) ~~A display~~ The LCD display according to claim 10, wherein said element has one surface which is stepped and is rendered at least partially light-reflecting to form a Fresnel reflecting arrangement.

14. (Currently Amended) ~~A display~~ The LCD display according to claim 10, wherein individual portions or facets of said stepped or ramped surface are convexly or concavely curved.

15. (Currently Amended) ~~A display~~ The LCD display according to claim 10, wherein said light-transmitting material is characterised by refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

16. (Withdrawn) A plate or sheet of light-transmitting material which sheet has one surface stepped or ramped to act as a Fresnel refractor or reflector and has an opposite surface which has surface relief or texturing to reduce reflection of light from that other surface.

★ 17-19 (Canceled)

20. (Currently Amended) An LCD display incorporating a plate or sheet ~~according to claim 16~~ of light-transmitting material which has one surface stepped or ramped to act as a Fresnel refractor or reflector and has an opposite surface which has surface relief or texturing to reduce reflection of light from that other surface.

21. (Withdrawn) An optical device comprising an element of light-transmitting material having a surface thereof configured to form a stepped, Fresnel-type light refracting element, said element incorporating an array of graded refractive index structures adapted to impart light dispersing or diffusing characteristics to said light-transmitting material, or the element having a layer configured to form said stepped surface and an additional layer incorporating such an array of graded refractive index features.

22. (Withdrawn) An optical device according to claim 21 wherein said graded refractive index features are of a size which is small in relation to the spacing between adjacent steps of the stepped Fresnel-type surface of said element.

23. (Withdrawn) An optical device according to claim 21, wherein said element has the general form of an extended, generally planar sheet or layer, and said graded refractive index structures each have a graded refractive index distribution, in a plane parallel with that of said sheet or layer, which is substantially the same in different parallel planes at successive respective positions along an axis extending from one side of said generally planar sheet or layer to the other.

24. (Withdrawn) An optical device according to claim 23, wherein said graded refractive index structures each have a graded refractive index distribution in such planes, which is substantially the same at all points along an axis perpendicular to the plane of said sheet or layer.

25. (Withdrawn) An optical device according to claim 20 wherein each said graded refractive index structure is a lens having an axis extending perpendicular to the plane of said planar sheet or layer, the refractive index within said structure being substantially constant along a line parallel with said axis and varying with distance from said axis.

26. (Withdrawn) An optical device according to claim 21, wherein one surface of said material is coated with light-reflecting material.

27. (Withdrawn) An optical device according to claim 26 wherein the stepped surface is coated with light-reflecting material.

28. (Withdrawn) A plate or sheet according to claim 3, wherein individual portions or facets surfaces of said stepped or ramped surface have surface relief or texturing.

29. (Withdrawn) A plate or sheet according to claim 3, wherein individual portions or facets surfaces of said stepped or ramped surface are convexly or concavely curved.

30. (Withdrawn) A plate or sheet according to claim 3, wherein at least one of said light-transmitting materials is characterized by refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

31. (Withdrawn) A liquid crystal display incorporating a plate or sheet according to claim 3.

32. (Withdrawn) A plate or sheet according to claim 17, wherein individual portions or facets of said stepped or ramped surface are convexly or concavely curved.

33. (Withdrawn) A plate or sheet according to claim 17, wherein said light-transmitting material is characterised by refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

34. (Withdrawn) A plate or sheet according to claim 18, wherein said light-transmitting material is characterised by refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

(35) (Currently Amended) An LCD display incorporating a plate or sheet according to claim 20, wherein said stepped or ramped surface has a reflective or semi-reflective coating to render the stepped or ramped surface fully or partially light reflective.

(36) (Currently Amended) An LCD display incorporating a plate or sheet according to ~~claim 18~~ claim 20, wherein individual portions or facets of said stepped or ramped surface are convexly or concavely curved.

(37) (Currently Amended) ~~An~~ The LCD display incorporating a plate or sheet according to ~~claim 19~~ claim 20, wherein said light-transmitting material comprises refractive index variations forming light-deviating features imparting bulk light-diffusing properties to the material.

38. (Withdrawn) An optical device according to claim 22, wherein said element has the general form of an extended, generally planar sheet or layer, and said graded

refractive index structures each have a graded refractive index distribution, in a plane parallel with that of said sheet or layer, which is substantially the same in different parallel planes at successive respective positions along an axis extending from one side of said generally planar sheet or layer to the other.

[39] (New) An LCD display having an LCD cell having upper and lower transparent plates superimposed upon a plate of light-transmitting material having a planar upper face parallel with the upper and lower plates of the LCD cell and having a Fresnel-stepped or ramped lower surface which is provided with a semi-reflective or transfective coating, the plate being interposed between the LCD cell and a back lighting assembly arranged to direct light towards the cell perpendicularly to the faces of the latter, whereby ambient light incident on the LCD cell at an angle to the perpendicular to said upper and lower plates and passing through the cell to said plate to be reflected by said semi-reflective coating can be reflected thereby to pass substantially perpendicularly through said cell.

[40] (New) An LCD display having an LCD cell having upper and lower transparent plates superimposed upon a composite, partially light-reflecting, partially light-transmitting plate which comprises a first body of light-transmitting material having an upper, outer surface which is generally planar and an inner stepped or ramped surface carrying or juxtaposed with a semi-reflective coating, said composite, partially light-reflecting, partially light-transmitting plate further comprising a second body of light-transmitting material provided on the opposite side of said semi-reflective coating from the first body of light-transmitting material, the inner or upper surface of said second body conforming to the underside of the coating, the upper surface of said first body, and the lower surface of said second body being planar and parallel with one another, said composite plate being interposed between the LCD cell and a back lighting assembly arranged to direct light towards the cell perpendicularly to the faces of the latter, whereby ambient light incident on the LCD cell at an angle perpendicular to said upper and lower plates and passing through the cell to said composite plate to be reflected by said semi-reflective coating can be reflected thereby to pass substantially perpendicularly through said cell, while light from said back lighting assembly can pass through said composite plate without being significantly deviated.

(41.) (New) The LCD display according to claim 40, wherein said second body of light-transmitting material is of the same refractive index as said first body.